

**MONITORING AND SAMPLING PLAN FOR EVALUATING IMPACTS OF THE CERRO
GRANDE FIRE**

LOS ALAMOS NATIONAL LABORATORY

LOS ALAMOS, NEW MEXICO

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1.0 Background:

Los Alamos National Laboratory (LANL) is conducting an extensive environmental monitoring and sampling program to evaluate the effects of the Cerro Grande fire at the Laboratory, and especially to evaluate if the Laboratory may have impacted public and worker health and the environment as a result of the fire. Just as importantly, the program identifies current baseline conditions that will aid in evaluating any future impacts the Laboratory may have, especially those resulting from contaminant transport offsite.

The program involves a number of different organizations within the Laboratory, as well as coordination with outside organizations and agencies. The Laboratory organizations involved are primarily the Hazardous Materials Response Group (ESH-10), the Air Quality Group (ESH-17), the Water Quality and Hydrology Group (ESH-18), the Ecology Group (ESH-20), the Integrated Geosciences Group (EES-13), the Environmental Sciences Group (EES-15), and the Environmental Restoration Project (ER). In addition, the U. S. Department of Energy Radiological Assistance Program (USDOE/RAP) also performed environmental measurements during the Cerro Grande fire.

External organizations include the New Mexico Environment Department (NMED), San Ildefonso Pueblo, Santa Clara Pueblo, Cochiti Pueblo, Jemez Pueblo, Los Alamos County, the U. S. Army Corps of Engineers (USACE), the U. S. Environmental Protection Agency (USEPA), the U. S. Forest Service, the U. S. Geological Survey (USGS), and the U. S. Park Service (Bandelier National Monument). The Department of Energy has an Agreement in Principle in place with the NMED. This Agreement provides for independent oversight monitoring of the Laboratory's activities. This monitoring, which is performed by the NMED DOE Oversight Bureau (NMED/DOB), involves routine air, water, soil, and sediment sampling, and measurement of external radiation fields in the environment. All routine monitoring will continue, as well as special sampling conducted by the NMED to address specific concerns raised by the Cerro Grande fire and its aftermath.

In addition to the NMED DOE Oversight Bureau, the Surface Water Quality Bureau (NMED/SWQB), the Hazardous Waste Bureau (NMED/HWB), and the Air Quality Bureau (NMED/AQB) have also enacted sampling programs related to the Cerro Grande fire.

San Ildefonso Pueblo, Cochiti Pueblo, Jemez Pueblo, and Santa Clara Pueblo have signed agreements with the Department of Energy and the Laboratory. These agreements include allowing access to monitoring locations at and near the Laboratory boundary, and encourage cooperative sampling, sharing of data, and enhanced communication on technical subjects.

Other outside agencies and organizations performing independent sampling include the USEPA, USGS, and USACE. These agencies have indicated that they will principally be collecting water and sediment samples.

A main focus of this Monitoring and Sampling Plan is to identify the special sampling that is occurring as a result of the fire. In addition to this sampling, the Laboratory operates and maintains an extensive and on-going Environmental Surveillance and Compliance Program. This Program provides baseline data on pre-fire conditions, as well as continues to operate and sample after the fire. It collects more than 11,000 environmental samples each year from more than 450 sampling stations in and around the Laboratory. Many of these sampling and measurement activities are

included in this document. For a complete description of the program, including description of and references to methods of analysis, please see “Environmental Surveillance at Los Alamos during 1998,” (LANL 1999). This report is published on the World Wide Web at <http://lib-www.lanl.gov/la-pubs/la-13633.pdf>.

This Plan is a living document, maintained by a working group comprised of the following members: Karen Agogino (USDOE/AL/LAAO), Tom Buhl (ESH-DO [Chair]), Jean Dewart (ESH-17), Phil Fresquez (ESH-20), Danny Katzman (EES-13, ER), and Robin Reynolds (ESH-18). The Plan will necessarily change as sampling plans become more specific and as rainfall events occur. It represents an overview at the time of its publication, but actual sampling that occurs may differ from the Plan as written.

2.0 Purpose:

This Plan provides a framework to coordinate the sampling and measurements among the different Laboratory organizations, ensure that the results of the sampling are preserved and easily accessible, and identify sampling and measurement needs. The Plan will also coordinate the Laboratory’s program with the programs of outside organizations and agencies.

3.0 Scope:

This Plan applies to all sampling and measurement activities conducted by the Laboratory that evaluate the effects of the Cerro Grande fire, and prepare the Laboratory for future events that may occur as a result of the fire.

This Plan lists the sampling activities of a number of different program elements, both at the Laboratory and in outside agencies and organizations. The Plan is an overview of the sampling effort, and does not contain detailed information about the various sampling programs. For more detailed information about each sampling program, including a complete list of sampling locations, sampling objectives and adequacy, conceptual models, and risk assessments for which the sampling is designed, please contact that program directly using the list of contacts given in Table 5.0.

4.0 Environmental Monitoring and Sampling Before and After the Cerro Grande fire

4.1 Air Sampling and Measurement

4.1.1 LANL Air Sampling

The Air Quality Group (ESH-17) is responsible for conducting air sampling, coordinating sample analysis, and maintaining and archiving air sampling results. Air sampling results are archived by ESH-17 with the ESH Records Center. Air sampling results are published on the Web at <http://www.air-quality.lanl.gov/airnet.htm>. This Web page provides a special link to air samples that were specifically collected in response to the fire.

ESH-17 maintains a network of 55 air monitoring stations on Laboratory land, around the perimeter of the Laboratory, and at regional locations distant from the Laboratory. This system, designated as “AIRNET”, operates continuously, and involves the collection of particulate airborne material on a filter and water vapor on silica gel. Each filter is analyzed for gross alpha and gross beta activities,

and gamma spectrometry is performed on groups of filters. In addition, ESH-17 also operates a sampler for particulate matter less than 10 microns in diameter.

Specific radiochemical isotopic analyses are performed on the filters for U-234, U-235, and U-238, Pu-238 and Pu-239/240, and Am-241. Normally these analyses are performed on composites of three months of filters from each sampling station, but during the fire filters from three shorter sampling periods were analyzed individually in order to obtain the information more quickly.

More detailed information is available in the ESH-17 AIRNET sampling and analysis plan (ESH-17 1999). A description of the air sampling procedures and a map of the routine sampling locations are given in the most recent Environmental Surveillance Report (LANL 1999) which is available on the Web at <http://lib-www.lanl.gov/la-pubs/la-13633.pdf>.

In addition to the AIRNET samplers, the initial response to the fire involved placing 7 portable air samplers around the Laboratory. These samplers were operated by ESH-10, but ESH-17 is coordinating the data analysis. The USDOE/RAP teams assumed responsibility for these sampling stations on May 11, 2000.

Special air sampling has continued after the fire, primarily in areas where remedial work is being performed. This sampling is also listed in Table 4.1.

The Laboratory's NEWNET network monitors airborne gamma-emitting radionuclides. This network is discussed in Section 4.5, External Radiation Measurements. NEWNET results are available on the Web at <http://NEWNET.lanl.gov/>.

4.1.2 Air Sampling by Other Organizations

In addition to air sampling performed by the Laboratory, air samples were also collected by the New Mexico Environment Department (NMED), the Department of Energy Radiological Assistance Program (USDOE/RAP), and the Environment Protection Agency (USEPA) during the Cerro Grande fire.

Each organization maintains, archives, and is the primary source of its own data. A listing of the air sampling results of the NMED, USEPA, and USDOE/RAP teams is found on the Web at <http://www.NMENV.state.nm.us/aqb/fires/default.htm#data>. On behalf of the Laboratory, ESH-17 is responsible for interacting with these other organizations, coordinating the Laboratory's air sampling with that of these organizations, and obtaining their data on a frequent basis so the Laboratory is up-to-date on their latest results.

4.1.3 Summary of Air Sampling during and after the Cerro Grande Fire as of the Date of this Report.

A summary of the activities and data of the different participating organizations conducting air sampling is given in Table 4.1.

4.2 Storm Water, Surface Water, Ground Water, and Sediment Sampling

4.2.1 LANL Storm Water, Surface Water, Ground Water, and Sediment Sampling

The Water Quality and Hydrology Group (ESH-18) and the Environmental Restoration Project (ER) have been working closely in coordinating their sampling efforts after the fire. ESH-18 is generally responsible for water quality at the Laboratory, and routinely performs sampling of ground, storm/surface water, as well as sediments. Data is maintained by ESH-18 in the Water Quality Data Base on the Safety1st server.

The Environmental Restoration Project (ER) is responsible for characterizing and evaluating the Laboratory's contaminated areas and inactive waste sites, and their clean-up. Many of these sites include contaminated sediments, such as in Pueblo and Los Alamos Canyons. In addition to sediment and soil sampling, the ER Project will also sample baseflow surface water and alluvial ground water. Data taken by the ER program is kept on the FIMAD data base. A description of the ER Project activities in response to the Cerro Grande fire is given at <http://erproject.lanl.gov/Fire/firehome.html>.

Currently, the Laboratory operates a system of 54 automated runoff samplers. These samplers collect surface water and storm water runoff samples including suspended sediments whenever runoff is present. Both filtered and unfiltered samples are analyzed in accordance with the priority analyte list established through the Watershed Integration Team (see attached Priority Analyte Listing). A description of the routine environmental sampling program is given in the most recent Laboratory Environmental Surveillance Report (LANL 1999) and is available on the World Wide Web at <http://lib-www.lanl.gov/la-pubs/la-13633.pdf>. Procedures are described in ESH-18 (1996).

In addition to the automated samplers, the Laboratory has organized several "on-the-ground" field teams to collect storm water runoff samples during storm events. From two to six teams will be deployed during the storm events. See Section 4.2.2 for coordination with other organizations.

Surface water samples collected to date by LANL are given in Table 4.2b. The Table also indicates the sampling date, locations, analytes, and when the results are expected to be available. A map showing the location of the stations is shown in Figure 4.2a. The preliminary results available to date and a description of the monitoring programs are given on the World Wide Web at <http://drambuie.lanl.gov/~esh18/>. Please note that these results are preliminary and are published here in the interest of making them available as soon as possible. They may be revised at a later date as the data is verified and reviewed under quality assurance requirements.

The Laboratory plans to participate in the sampling of the Rio Grande and Cochiti Reservoir, and perform co-sampling with the USGS and the NMED. A recently completed Scope of Work and contract between the Laboratory and the USGS is discussed below in the Section on the USGS. The work involves samples along the Rio Grande, in Cochiti Reservoir, and below the Cochiti Reservoir discharge point.

The Laboratory also operates 45 ground water monitoring wells, 15 surface water monitoring stations (in addition to the automated runoff samplers described above), and over 60 sediment monitoring stations under the routine environmental surveillance program. These are typically sampled annually, but the sampling frequency can be increased if needed to accommodate special sampling requirements. These are described in LANL (1999). This report is available on the Web at <http://lib-www.lanl.gov/la-pubs/la-13633.pdf>.

4.2.2. Storm Water, Surface Water, Ground Water, and Sediment Sampling by Other Organizations

New Mexico Environment Department. The NMED conducts routine surface water sampling at selected locations around Los Alamos as part of the NMED Agreement in Principal (AIP) Oversight Program. In addition, the NMED-AIP Team has deployed four automatic surface water samplers, and a fifth sampler provided by LANL. The Laboratory has made provisions available at its automatic sampling station locations, and the NMED has co-located its samplers at sampling locations in Water Canyon (E263), Mortandad Canyon (E201), DP Canyon (E040), Three-Mile Canyon (E246), and Los Alamos Canyon (E030). In addition, the NMED is in the process of installing an automatic sampler in Pajarito Canyon.(see Figure 4.2a for these sampling station locations). The samplers begin collecting samples after receiving a signal from the LANL sensors in the watercourse. The NMED has also installed three single-stage samplers in Acid Canyon.

One person from the NMED will also be a member of each “on-the-ground” field team to collect surface water samples during each storm event. In addition, the NMED is invited to participate in the sampling of the Rio Grande and Cochiti being led by the U. S. Geological Survey.

The NMED has collected storm water and surface water samples in response to the Cerro Grande fire and its aftermath. These samples are listed in Table 4.2c, along with their analytes.

U. S. Geological Survey. Under contract from the Laboratory (ESH-18) and the Army Corps of Engineers, the USGS has the lead role for the sampling of the Rio Grande and Cochiti Reservoir. Both the Laboratory and the NMED will participate in this effort and perform co-sampling. San Ildefonso Pueblo and Cochiti Pueblo have been kept informed of this sampling and will receive the sampling results.

A recently completed Scope of Work and contract between the Laboratory and the USGS identifies that the USGS has been contracted to head up and lead the Laboratory’s Rio Grande/Cochiti Reservoir sampling initiative. These samples are described in Table 4.2a. Rio Grande samples will be collected at the USGS gauging station at Otowi, at the USGS gauging station at Water Canyon, and at a location near Buckman below the entrance of Mortandad Canyon (if feasible). The Cochiti Reservoir samples will include a location near the Cochiti dam, a location in the center of the reservoir near the boat launch, and a location at the upstream end of the reservoir. Finally, a sample will be collected below the Cochiti Reservoir outlet. At the date of this report, five samples have been collected by the USGA for LANL, as noted in Table 4.2a.

The USGS has also been contracted by the Army Corp of Engineers to install a gauging station along the Rio Grande upstream from Cochiti Reservoir, and to collect water samples on the Rio Grande upstream from Cochiti Reservoir, in Cochiti Reservoir, and below the Cochiti Reservoir outlet. Three samples have been collected by the USGS for the USACE at the date of this report, as seen in Table 4.2a.

U. S. Environmental Protection Agency. According to an attachment to the June 21, 2000 e-mail from David Neleigh (USEPA) to Joseph Vozella (USDOE/LAAO), the USEPA is planning on collecting sediment, soil, and surface water samples after storm runoff events. The areas sampled would include Los Alamos County land, San Ildefonso Pueblo, and Cochiti Pueblo. The USEPA indicated that the samples would be analyzed for both radiological and non-radiological constituents.

U. S. Army Corps of Engineers. The USACE has contracted with the USGS to install a gauging station and a water quality monitoring station in the Rio Grande, and collect water samples. These are described in the Section on the USGS above.

4.2.3 Summary of Storm Water, Surface Water, Ground Water, and Sediment Sampling during and after the Cerro Grande Fire as of the Date of this Report.

A summary of the activities and data of the different participating organizations conducting surface water and storm water sampling is given in Table 4.2a. A listing of the special storm water samples collected to date by LANL is given in Table 4.2b, and a listing of the special surface water samples collected by the NMED is given in Table 4.2c. Summaries of sampling activities for ground water and sediment sampling are given in Tables 4.2d and 4.2e, respectively.

4.3 Soil Sampling

4.3.1 LANL Soil Sampling

The Ecology Group (ESH-20) performs soil sampling as part of the Laboratory's routine environmental surveillance program. The Environmental Restoration Project samples soil at inactive LANL contaminated sites and waste sites. The ESH-20 data is kept on the ESH-20 data base, and the ER data is kept on the FIMAD data base.

In addition to direct sampling of the soil, the ER Project conducts detailed gross gamma radiation surveys at selected sites through its contractor CHEMRAD. The radiation level measurements are focused on Cs-137, which can often be used as tracers for other radionuclides (weak- or non-gamma emitters) and possibly hazardous non-radioactive constituents also present in the soil.

As part of the routine environmental surveillance program, soils are monitored at 25 on-site, Laboratory perimeter, and at regional locations. Samples are currently being analyzed for radiological, inorganic, and organic constituents, and reported in the annual environmental surveillance reports such as LANL (1999). These sample results provide baseline information on soil concentrations for pre-fire conditions. The environmental surveillance reports are published on the World Wide Web at <http://lib-www.lanl.gov/la-pubs/la-13633.pdf>.

4.3.2 Soil sampling by other organizations.

In addition to soil sampling by LANL groups and programs, the NMED has performed soil sampling in response to the Cerro Grande fire. These samples are listed in Table 4.3. The USEPA also has plans to perform soil sampling. Other organizations may also perform sampling in response to the fire and its aftermath.

During the fire, the USDOE/RAP teams took measurements with the Violinist instrument, which measures low-energy gamma and x-ray radiation, at 69 locations in the surrounding areas, including Santa Fe, Bernalillo, and Rio Arriba counties. These measurements are primarily to estimate possible soil concentrations of transuranics.

The USDOE has also performed periodic aerial surveys of the Laboratory, the most recent being in 1994 (USDOE 1998). These surveys have been used to estimate surface soil concentrations of gamma-emitting radioactive material.

4.3.3 Summary of Soil Sampling during and after the Cerro Grande Fire as of the Date of this Report

A summary of the activities and data of the different participating organizations conducting soil sampling is given in Table 4.3.

4.4 Biota Sampling (including ash)

4.4.1 LANL Biota Sampling

The Ecology Group (ESH-20) performs biota sampling as part of the Laboratory's routine environmental surveillance program. In the aftermath of the fire ESH-20 has collected ash samples and fish samples. This data is being kept on the ESH-20 data base.

The Environmental Restoration Project has also sampled ash at background locations. The ER data is kept on the FIMAD data base.

Biota are monitored as part of the Laboratory's routine environmental surveillance program. Biota samples include produce, honey, eggs, milk, fish, large and small game animals (elk, deer, squirrels), beef cattle, herbs/tea, pinon nuts, and mushrooms. These are described in the Laboratory's annual Environmental Surveillance Report (LANL 1999). In addition to a description of the sampling program, the report also references the sampling and quality assurance/quality control procedures. The Environmental Surveillance Report is available on the World Wide Web at <http://lib-www.lanl.gov/la-pubs/la-13633.pdf>.

4.4.2 Biota sampling by other organizations.

In addition to biota sampling by LANL groups and programs, the NMED has collected ash samples at selected locations on the Laboratory and in the surrounding area. Their data are kept on the NMED data base. Other organizations may also perform sampling in response to the fire and its aftermath.

4.4.3 Summary of Biota Sampling during and after the Cerro Grande Fire as of the Date of this Report.

A summary of the activities and data of the different participating organizations conducting biota sampling is given in Table 4.4.

4.5 External Radiation Measurements

4.5.1 LANL External Radiation Measurements

The Air Quality Group (ESH-17) is responsible for conducting external radiation measurements. ESH-17 operates several networks of TLDs around the Laboratory and the surrounding area. The

routine TLD surveillance network is comprised of 95 TLD stations, and the active and inactive waste site network has 97 stations. A network of 7 albedo dosimeters measures neutron radiation around TA-18. External radiation measurement results are archived by ESH-17 with the ESH Records Center. These systems are described at <http://www.esh.lanl.gov/~AirQuality/TLD-Current.htm> and <http://www.esh.lanl.gov/~AirQuality/Albedo-TLD.htm>. The data are published annually in the environmental surveillance reports. The most recent report (LANL 1999) is available on the World Wide Web at <http://lib-www.lanl.gov/la-pubs/la-13633.pdf>

In addition to the TLD network, the Laboratory operates 19 New Mexico stations in the Neighborhood Environmental Watch Network (NEWNET) through the Safeguards Science and Technology Group (NIS-5). These stations perform real-time measurements of external gamma radiation levels and publish them on the World Wide Web at <http://NEWNET.lanl.gov/>.

The Environmental Restoration Project conducts detailed radiation surveys at contaminated areas and inactive waste sites where gamma emitters are present. This program, however, is designed to determine the extent of the contamination rather than the external radiation level, and is discussed in the section on soil sampling.

4.5.2 External Radiation Measurements by Other Organizations

In addition to external radiation measurements performed by the Laboratory, the NMED operates a network of 12 TLDs around the Laboratory. The data is kept on the NMED data base.

The U. S. Department of Energy has performed aerial radiation surveys of the Laboratory through the Remote Sensing Laboratory at Las Vegas, Nevada (USDOE 1998). The most recent was performed in 1994 and provides baseline information on external radiation levels at LANL. The surveys are also used to calculate surface soil concentrations of gamma-emitting radioactive material, and complement the information collected by the ER Project.

4.5.3 Summary of External Radiation Measurements during and after the Cerro Grande Fire as of the Date of this Report.

A summary of the activities and data of the different participating organizations conducting external radiation measurements is given in Table 4.5.

4.6 Other Measurements

4.6.1 LANL Measurements

The Environmental Restoration Project has conducted an extensive program of laser altimetry (LIDAR) to characterize the pre-flood landscape morphology. These measurements will be used to determine flood-related erosion and deposition. The ER Project maintains a Website at <http://erproject.lanl.gov/Fire/firehome.html> describing its fire-related activities.

4.6.2 Measurements by Other Organizations

The Department of Energy, through the Bechtel Nevada Remote Sensing Laboratory, has performed several multi-spectral scans in the infrared of the Laboratory and surrounding area affected by the fire. These were used to help identify which areas had hydrophobic soil.

4.6.3 Summary of Other Measurements during and after the Cerro Grande Fire as of the Date of this Report.

A summary of the activities and data of the different participating organizations conducting measurements is given in Table 4.6.

4.7 Biological and Cultural Evaluations: Archaeology, Threatened and Endangered Species

4.7.1 LANL Biological and Cultural Evaluations

The Ecology Group (ESH-20) performs biological and cultural evaluations as part of the its routine programs supporting the Laboratory's routine environmental surveillance program, NEPA assessments, the Threatened and Endangered Species Act evaluations, and other programs. In the aftermath of the fire ESH-20 has performed several evaluations to assess the fire's impacts on cultural and biological resources at the Laboratory. This data is being kept on the ESH-20 data base.

4.7.2 Biological and Cultural Evaluations by Other Organizations.

The NMED collects biological information in an on-going program through the DOE Oversight Bureau. Other agencies and organizations are expected to perform evaluations in these areas, but have not been specifically identified at the time of this report.

4.7.3 Summary of Biological and Cultural Evaluations during and after the Cerro Grande Fire as of the Date of this Report.

A summary of the activities and data of the different participating organizations conducting biological and cultural evaluations is given in Table 4.7.

5.0 Obtaining the Data; List of Contacts

Data may be obtained by contacting the organization performing the sampling. The Tables 4.1 – 4.7 list the organizations and where the data is being kept. A list of contacts for the various organizations is given in Table 5.0.

In some cases, the data is presented on the World Wide Web. If so, the Web addresses are also given in Tables 4.1 – 4.7.

References:

ESH-17 1999: Air Quality Group, "Sampling and Analysis Plan for Radiological Air Sampling Network (AIRNET)," Air Quality Group document ESH-17-AIRNET (January 1999).

ESH-18 1996: Water Quality Group, "Draft Quality Assurance Project Plan," (September 1996).

LANL 1999: Los Alamos National Laboratory, "Environmental Surveillance at Los Alamos during 1998," Los Alamos National Laboratory report LA-13633-ENV (September 1999).

USDOE 1998: U. S. Department of Energy, "An Aerial Radiological Survey of the Los Alamos National Laboratory and Surrounding Area," U. S. DOE report DOE/NV/11718-107 (March 1998).

Tables:

Table 4.1. Organizations conducting air sampling related to the Cerro Grande fire.

Table 4.2a. Organizations conducting surface water, ground water, and sediment sampling related to the Cerro Grande fire.

Table 4.2b. Storm Water Samples Collected by LANL to the Date of this Report

Table 4.2c. Storm Water Samples Collected by NMED DOE Oversight and Hazardous Waste Bureaus to the Date of this Report

Table 4.2d. Organizations conducting ground water sampling related to the Cerro Grande fire.

Table 4.2e. Organizations conducting sediment sampling related to the Cerro Grande fire.

Table 4.3. Organizations conducting soil sampling related to the Cerro Grande fire.

Table 4.4. Organizations conducting biota sampling related to the Cerro Grande fire.

Table 4.5. Organizations conducting environmental radiation measurements related to the Cerro Grande fire.

Table 4.6. Organizations conducting other measurements related to the Cerro Grande fire.

Table 4.7. Organizations conducting biological and cultural evaluations related to the Cerro Grande fire.

Table 5.0. Organization contacts for sampling related to the Cerro Grande Fire.

Figures:

Figure 4.2a. Location of Gauging Stations at LANL.

Table 4.1. Organizations conducting air sampling related to the Cerro Grande fire.

Organization	Type of Sample	Sampling Dates	Number of Stations	Analyte	Data Storage	Other Information
LANL	Air particulate	Operated continuously before, during, and after the fire	55	U-234, U-235, U-238, Pu-238, Pu-239/240, Am-241, gross alpha, gross beta, gamma spectroscopy, Be	ESH-17 AIRNET Microsoft Access data base	available at http://www.air-quality.lanl.gov/airnet.htm
	Water vapor	Operated continuously before, during, and after the fire	55	H-3	ESH-17 AIRNET Microsoft Access data base	available at http://www.air-quality.lanl.gov/airnet.htm
	Air particulate (PM-10)	Operated continuously before, during, and after the fire	1	PM-10	ESH-17 AIRNET Microsoft Access data base	available at http://www.air-quality.lanl.gov/airnet.htm
	Air particulate (special sampling with portable samplers)	Seven sampling stations during the fire (eventually taken over by USDOE/RAP);	7	gross alpha, gross beta, gamma spectroscopy	ESH-17 AIRNET Microsoft Access data base	available at http://www.air-quality.lanl.gov/airnet.htm
	Air particulate	May 26 – June	2 stations, TA-	U-234, U-235,	ESH-17	will be

	(TSP) special sampling with portable samplers	19, 2000	16, Material Disposal Area R	U-238, Pu-238, Pu-239/240, Am-241, Metals	AIRNET Microsoft Access data base	available at http://www.air-quality.lanl.gov/airnet.htm
	Air gases – special sampling with portable samplers	June 2 – June 13, 2000	2 stations, TA-16, Material Disposal Area R	VOC's	ESH-17 AIRNET Microsoft Access data base	will be available at http://www.air-quality.lanl.gov/airnet.htm
	Air particulate (TSP) special sampling with portable samplers	July 11, 2000 – ongoing	1 station, Pueblo Canyon	U-234, U-235, U-238, Pu-238, Pu-239/240, Am-241	ESH-17 AIRNET Microsoft Access data base	will be available at http://www.air-quality.lanl.gov/airnet.htm
	Air particulate (TSP) special sampling with portable samplers	Potential start, July 27, 2000	1 station, Mortandad Canyon sediment traps	U-234, U-235, U-238, Pu-238, Pu-239/240, Am-241, Metals	ESH-17 AIRNET Microsoft Access data base	will be available at http://www.air-quality.lanl.gov/airnet.htm
NMED	Air particulate	Operated continuously before, during, and after the fire	5	U-234, U-235, U-238, Pu-238, Pu-239/240, gross alpha, gross beta	NMED; ESH-17 will keep track on behalf of LANL	available at http://www.NMENV.state.nm.us/aqb/fires/default.htm#data
	Air particulate	Operated continuously before, during, and after the fire	5	PM-10, PM-2.5	NMED; ESH-17 will keep track on behalf of LANL	available at http://www.NMENV.state.nm.us/aqb/fires/default.htm#data

USEPA/NMED (Environmental Radiation Air Monitoring System)	Air particulate	Operated continuously before, during, and after the fire	2 stations: PERA Building, Santa Fe, and a special station installed in Espanola in response to the fire	gross alpha, gross beta,	USEPA, NMED; ESH-17 will keep track on behalf of LANL	available at http://www.NMENV.state.nm.us/aqb/fires/default.htm#data
USEPA	Air particulate	May 13 – 17, 2000	20	gross alpha, gross beta, gamma spectroscopy	USEPA; ESH-17 will keep track on behalf of LANL	available at http://www.NMENV.state.nm.us/aqb/fires/default.htm#data .
	Air particulate, gases	May 13 – 17, 2000	2	Volatiles, Metals, polycyclic aromatic hydrocarbons (PAHs)	USEPA; ESH-17 will keep track on behalf of LANL	available at http://www.NMENV.state.nm.us/aqb/fires/default.htm#data .
	Air particulate (PM-10)	May 13 – 16, 2000	1 (Espanola)	PM-10	USEPA; ESH-17 will keep track on behalf of LANL	available at http://www.NMENV.state.nm.us/aqb/fires/default.htm#data .
USDOE/RAP	Air particulate	May 11 – 17, 2000	7	gross alpha, gross beta, gamma spectroscopy	USDOE/RAP; ESH-17 will keep track on behalf of LANL	available at http://www.NMENV.state.nm.us/aqb/fires/default.htm#data

Table 4.2a. Organizations conducting surface water and storm water sampling related to the Cerro Grande fire.

Organization	Type of Sample	Sampling Date	Number of Stations/ Location	Analyte	Data Storage	Other Information
LANL	Storm water/Surface water (runoff);	Please see table 4.2b (below) for a listing of all storm water samples collected by LANL to date	26 samples collected to date, see Figure 4.2a for map of locations	radiological, inorganic, organic constituents, Total and dissolved solids, including suspended sediments;	ESH-18 Microsoft Access data base	ESH-18 sampling program, available at http://drambuie.lanl.gov/~esh18/ . (see Figure 4.2a and http://lib-www.lanl.gov/la-a-pubs/la-13633.pdf . for map of sampling locations)
	Storm Water(runoff); Automatic samplers	All storm events; Automated samplers operated continuously	Currently 54 stations above and in LANL canyons	Storm Water Permit Parameters (Also attached Priority Analyte List), Total and dissolved solids, including suspended sediments;	ESH-18 Microsoft Access data base	LANL ESH-18 Storm Water Team has lead

	Storm water (runoff); On-the-ground sampling teams	All Storm events	2 – 6 teams in canyons	See attached Priority Analyte List. Total and dissolved solids, including suspended sediments;	ESH-18 Access Data Base	LANL ESH-18 Storm Water Team has lead. LANL ER Project is also collecting samples.
	Surface water, mainly grab samples. Bank sediments; Width-integrated riverbed sediments; grab samples	before and after storm events	1) Rio Grande: <ul style="list-style-type: none"> • USGS gauging station at Otowi; • USGS gauging station at Water canyon • near Buckman, below Mortandad confluence (if practicable) 2) Cochiti Reservoir <ul style="list-style-type: none"> • near dam • reservoir center (near boat launch) • upstream 	Metals (total and dissolved), radionuclides (total and dissolved), anions (dissolved), nutrients (total and dissolved), cations (dissolved), organics (all totals, including VOCs, SVOCs, high explosives, PCBs, dioxins/furans, pesticides, herbicides, and total petroleum hydrocarbons and diesel range organics), total organic	ESH-18 Access Date Base	USGS has lead, under contract from LANL and USACE. LANL and NMED may co-sample. See USGS below.

			end of reservoir 3) below reservoir outlet	carbon, total suspended sediments, particle size distribution for suspended sediments		
	Surface water	Sampled once a year or as necessary	15 sites	Total rad, dissolved metals, Total and dissolved solids, including suspended sediments	ESH-18 Access data base	Routine LANL environmental surveillance program, ESH-18
	Surface water baseflow	baseline taken by June 5, 2000	4 locations in Pueblo Canyon; 4 locations in Pajarito Canyon; 3 locations in Los Alamos Canyon; 1 location in Mortandad; 4 locations in Water/Canyon del Valle	Alkalinity, anions, radionuclides, metals, pesticides, PCBs, ammonium, phosphate, SVOCs, cyanide, TSS, dioxins	LANL FIMAD data base	ER Project, sampling
NMED	Surface water	Please see Table 4.2c for a listing of all	25 surface water samples collected to	selected radiological, inorganic, and	NMED data base	

		samples collected by the NMED	date	organic analytes		
	Surface water (runoff); Automatic samplers	Automated samplers operated continuously before, during, and after the fire	4 stations in canyons, LANL is installing boxes in all major drainages where NMED samplers may be installed and triggered from LANL samplers	selected radiological, inorganic, organic analytes, and Total and dissolved solids.	NMED data base	
	Surface water (runoff); On-the-ground sampling teams	Storm events	2 – 6 teams in canyons	selected radiological, inorganic, and organic analytes	NMED data base	will have one person on each sampling team, will split samples
	Surface water - total and dissolved solids; Bank sediments; Width-integrated riverbed sediments	before and after storm events	1) Rio Grande: <ul style="list-style-type: none"> • USGS gauging station at Otowi; • USGS gauging station at Water canyon • near Buckman, below Mortandad 			USGS has lead in sampling these locations. USGS has contract with the Army Corps of Engineers and LANL. LANL and NMED may co-sample.

			confluence (if practicable) 2) Cochiti Reservoir <ul style="list-style-type: none"> • near dam • reservoir center (near boat launch) • upstream end of reservoir 3) below reservoir outlet			
USGS	Surface water - total and dissolved solids;	June 28, 2000	Rio Grande near White Rock	see footnote 2		Client: USACE
	Surface water - total and dissolved solids;	July 5, 2000	Rio Grande near Mortandad; Upper Cochiti Reservoir	see footnote 1		Client: LANL
	Surface water - total and dissolved solids;	July 6, 2000	Rio Grande at Otowi; Middle Cochiti Reservoir	see footnote 1		Client: LANL
	Surface water - total and	July 7, 2000	Rio Grande at White Rock	see footnote 1		Client: LANL

	dissolved solids;					
	Surface water - total and dissolved solids;	July 8, 2000	Lower Cochiti Reservoir	see footnote 1		Client: LANL
	Surface water - total and dissolved solids;	July 11, 2000	Cochiti Reservoir Outlet	see footnote 1		Client: LANL
	Surface water - total and dissolved solids;	July 17, 2000	Rio Grande near White Rock	see footnote 2		Client: USACE
	Surface water - total and dissolved solids;	July 19, 2000	Lower Cochiti Reservoir, below Cochiti Reservoir Outlet	see footnote 2		Client: USACE
	Surface water - total and dissolved solids; Bank sediments; Width-integrated riverbed sediments	1) two sets of samples during major runoff events in July – September, 2000; 2) a set of samples near the end of September after the end of the	For LANL contract: 1) Rio Grande: <ul style="list-style-type: none"> USGS gauging station at Otowi; USGS gauging station at 	see footnote 1 for analytes collected under LANL contract; see footnote 2 for analytes collected under USACE contract;		USGS has lead in sampling these locations. Has contract with the Army Corps of Engineers and LANL.

		summer rainy season	<p>Water canyon</p> <ul style="list-style-type: none"> • near Buckman, below Mortandad confluence (if practicable) <p>2) Cochiti Reservoir</p> <ul style="list-style-type: none"> • near dam • reservoir center (near boat launch) • upstream end of reservoir <p>3) below reservoir outlet</p> <p>For USACE contract:</p> <p>1) Rio Grande (mid-Laboratory, Frijoles), 2) Cochiti Reservoir near dam, 3) below Cochiti outlet</p>			
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San Ildefonso Pueblo	Surface water - total and dissolved solids; Bank sediments; Width-integrated riverbed sediments	before and after storm events	Rio Grande and Cochiti Reservoir (see description of USGS sampling for LANL and USACE contracts above)			will participate in USGS sampling and receive sampling results
Cochiti Pueblo	Surface water - total and dissolved solids; Bank sediments; Width-integrated riverbed sediments	before and after storm events	Rio Grande and Cochiti Reservoir (see description of USGS sampling for LANL and USACE contracts above)			will participate in USGS sampling and receive sampling results
Army Corps of Engineers	Surface water - total and dissolved solids; Bank sediments; Width-integrated riverbed sediments	before and after storm events	1) Rio Grande (mid-Laboratory, Frijoles), 2) Cochiti Reservoir near dam, 3) below Cochiti outlet	Includes dissolved major ions, B, Fe, nutrients, uranium isotopes, americium-241, plutonium isotopes, strontium-90, gross alpha and beta, DOC,		contracted the USGS to set up a gauging station on Rio Grande, and water quality monitoring stations near White Rock and at Cochiti Reservoir

				total Hg, Se, organic carbon. In suspended sediment, includes uranium isotopes, americium-241, plutonium isotopes, gross alpha and beta.		
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¹Analytes for USGS samples collected under LANL contract: Metals (total and dissolved), radionuclides (total and dissolved), anions (dissolved), nutrients (total and dissolved), cations (dissolved), organics (all totals, including VOCs, SVOCs, high explosives, PCBs, dioxins/furans, pesticides, herbicides, and total petroleum hydrocarbons and diesel range organics), total organic carbon, total suspended sediments, particle size distribution for suspended sediments

²Analytes for USGS samples collected under USACE contract: Includes dissolved major ions, B, Fe, nutrients, uranium isotopes, americium-241, plutonium isotopes, strontium-90, gross alpha and beta, DOC, total Hg, Se, organic carbon. In suspended sediment, includes uranium isotopes, americium-241, plutonium isotopes, gross alpha and beta.

Table 4.2b. Storm Water Samples Collected by LANL to the Date of this Report

Sam- ple #	Sample Date	E# ^{ab}	Station Name	Date Shipped	Public Release of Results	1 ^a	2 ^a	3 ^a	4 ^a	5 ^a	6 ^a	7 ^a	8 ^a	9 ^a	Comments
1	06/03/2000	E025	Los Alamos Canyon at Los Alamos	06/05/2000	08/04/2000	G		X	X	X		X			
2	06/02/2000	E030	Los Alamos Canyon Below Technical Area (TA) 2 near Los Alamos,	06/05/2000	08/04/2000	A	X	X	X	X		X			
3	06/02/2000	E040	DP Canyon at Mouth	06/05/2000	08/04/2000	A	X	X	X	X		X			
4	06/02/2000	E042	Los Alamos Canyon near Los Alamos,	06/05/2000	08/04/2000	G	X	X	X	X		X			
5	06/02/2000	E042	Los Alamos Canyon near Los Alamos,	06/05/2000	08/04/2000	A	X	X	X	X		X			
6	06/28/2000	E250	Pajarito Canyon above Highway 4 near White	06/30/2000	08/25/2000	A	X	X	X	X		X	X	X	

			Rock												
7	06/28/2000	M246.5	Culvert at TA-18	06/30/2000	08/25/2000	G		X	X	X		X	X	X	
8	06/28/2000	M250.1	State Road 4 Culvert (east side)	06/30/2000	08/25/2000	G		X	X	X		X	X	X	
9	06/28/2000	M246.6	G-1 Pump Station	06/30/2000	08/25/2000	G		X	X	X		X	X	X	
10	06/28/2000	E241	Pajarito Canyon at TA-22	06/30/2000	08/25/2000	A	X	X	X	X		X	X	X	
11	06/28/2000	E242	Starmers Gulch at TA-22	06/30/2000	08/25/2000	A		X	X	X		X	X	X	
12	06/28/2000	E240	Pajarito Canyon above Highway 501 near Los Alamos,	06/30/2000	08/25/2000	A		X	X	X		X	X	X	
13	06/28/2000	E265	Water Canyon below Highway 4 near White Rock	06/30/2000	08/25/2000	G	X	X	X	X		X	X	X	

14	06/28/2000	E264	Indio Canyon at Highway 4	06/30/2000	08/25/2000	G	X	X	X	X		X	X	X	
15	06/28/2000	E253	Canon Del Valle above Highway 501 near Los Alamos	06/30/2000	08/25/2000	G		X	X	X		X	X	X	
16	06/28/2000	E252	Water Canyon above Highway 501 near Los Alamos	06/30/2000	08/25/2000	G		X	X	X					
17	07/09/2000	E042	Los Alamos Canyon near Los Alamos	07/10/2000	09/04/2000	A	X	X	X	X				X	
18	07/09/2000	M090	Guaje at SR 4	07/10/2000	09/04/2000	G		X	X	X				X	
19	07/16/2000	E122	Sandia Canyon near Roads & Grounds at TA-3	07/19/2000	09/12/2000	A	X		X	X					TSS, PCB only
20	07/17/2000	M083	Rendija 3rd Crossing	07/19/2000	09/12/2000	G		X	X	X					
21	07/17/2000	E196	TA-55	07/19/2000	09/12/2000	A	X	X	X	X					

22	07/15/2000	E223	Area L	07/19/2000	09/12/2000	A	X		X	X		X			SW Permit plus conductivity , TDS
23	07/17/2000	E122	Sandia Canyon near Roads & Grounds at TA-3	07/19/2000	09/12/2000	A	X	X	X	X					
24	07/17/2000	E223	Area L	07/19/2000	09/12/2000	A	X	X	X	X		X			
25	07/18/2000	E025	Los Alamos Canyon at Los Alamos	07/20/2000	09/12/2000	G		X	X	X		X			Split with NMED DOE-AIP
26	07/21/2000	M043	Los Alamos Canyon Retention Pond at Highway 4	07/25/2000	09/12/2000	G	X	X	X	X		X			Split with NMED DOE-AIP
27	07/25/2000	E039	DP Canyon below Meadow at TA-21	8/1/2000	9/19/2000	A			X	X		X			
28	07/29/2000	E248	G-2	8/1/2000	9/19/2000	A	X	X	X	X		X			
29	07/29/2000	E248. 5	G-3	8/1/2000	9/19/2000	A	X		X	X					
30	07/29/2000	E227	G-6	8/1/2000	9/19/2000	A	X	X	X	X		X			
31	07/29/2000	E230	Canada del Buey at White Rock	8/1/2000	9/19/2000	A	X	X	X	X		X			
32	07/29/2000	E265	Water Canyon	8/2/2000	9/19/2000	A	X	X	X	X		X	X		

			below SR 4 near White Rock												
33	08/9/2000	E221	TA-54, Area J	8/11/2000	9/22/2000	A	X			X					
34	08/9/2000	E227	TA-54, Area G, G-6	8/11/2000	9/22/2000	A	X			X		X			
35	08/9/2000	E230	Canada del Buey at White Rock	8/11/2000	9/22/2000	A	X	X				X			
36	08/9/2000	E247	G-1	8/11/2000	9/22/2000	A	X	X							
37	08/9/2000	E248	G-2	8/11/2000	9/22/2000	A	X	X	X	X		X	X	X	
38	08/9/2000	E248. 5	G-3	8/11/2000	9/22/2000	A	X	X		X		X			
39	08/9/2000	E267	Potrillo Canyon near White Rock	8/11/2000	9/22/2000	A	X	X	X	X		X			
40	08/14/2000	E265	Water Canyon below SR 4 near White Rock	8/16/2000	9/28/2000	A		X	X	X			X		
41	08/15/2000	E249. 5	G-4	8/16/2000	9/28/2000	A	X	X	X	X					
42	08/18/2000	E265	Water Canyon below SR 4 near White Rock	8/21/2000	10/6/2000	G	X	X	X	X	X	X	X	X	
43	08/18/2000	E230	Canada del Buey at White Rock	8/21/2000	10/6/2000	A		X	X	X					
44	08/18/2000	E248. 5	G-3	8/21/2000	10/6/2000	A	X	X	X	X	X	X	X	X	
45	08/18/2000	E227	TA-54,	8/21/2000	10/6/2000	A	X	X	X	X					

			Area G, G-6												
46	08/18/2000	E230	Canada del Buey at White Rock	8/21/2000	10/6/2000	A		X	X	X					

^a Key to column abbreviations:

1. Grab sample or automatic sampler
2. Storm Water Permit sample
3. Analysis for radioactive constituents
4. Analysis for metals
5. Analysis for inorganics
6. Analysis for volatile organics
7. Analysis for SVOAs and PCBs
8. Analysis for high explosive compounds
9. Analysis for furans/dioxins

^b See figure 4.2a for a map of the sampling locations

Table 4.2c. Storm Water Samples Collected by NMED DOE Oversight and Hazardous Waste Bureaus

Sample Date	Sample Location	1 ^a	2 ^a	3 ^a	4 ^a	5 ^a	6 ^a	7 ^a	8 ^a	9 ^a	10 ^a	11 ^a	12 ^a	13 ^a	14 ^a	15 ^a	16 ^a	17 ^a	18 ^a	19 ^a	20 ^a	21 ^a	22 ^a	23 ^a	24 ^a	25 ^a	26 ^a	27 ^a	28 ^a	29 ^a	30 ^a	
05/02/2000	Pajarito west of LANL		P	G				X																								
05/25/2000	Pajarito west of LANL		P	G	X		X	X		X							X	X					X		X	X	X	X	X	X	X	
05/25/2000	SR 501 (pond)		A	G	X		X	X		X							X	X					X		X	X	X	X	X	X	X	
06/15/2000	Homestead Spring (Pajarito Canyon)		SP	G	X		X	X		X		X	X				X	X								X	X	X	X	X	X	X
06/15/2000	Kieling Spring (Pajarito Canyon)		SP	G	X		X	X		X		X	X				X	X								X	X	X	X	X	X	X
06/15/2000	Bulldog Spring		SP	G	X		X	X		X		X	X				X	X								x	X	X	X	X	X	X
06/15/2000	Charlie's Spring (Pajarito Canyon)		SP	G	X		X	X		X		X	X				X	X								x	X	X	X	X	X	X
06/15/2000	Starmer Spring (Pajarito Canyon)		SP	G	X		X	X		X		X	X				X	X								x	X	X	X	X	X	X
06/15/2000	Pajarito Canyon		P	G	X		X	X		X		X	X				X	X								X	X	X	X	X	X	X
06/15/2000	Pajarito Canyon		P	G	X		X	X				X	X				X	X								X	X	X	X	X	X	X
06/29/2000	Pajarito @ Jct. Of Two Mils. C		P	G	X		X	X	X	X		X	X				X	X					X		X	X	X	X	X	X	X	

Table 4.2d. Organizations conducting ground water sampling related to the Cerro Grande fire.

Organization	Type of Sample	Sampling Date	Number of Stations/ Location	Analyte	Data Storage	Other Information
LANL	Ground water	Sampled once a year, or as necessary	45 wells			Routine LANL environmental surveillance program (ESH-18)
	Alluvial ground water	baseline taken by June 5, 2000	4 wells in Pueblo Canyon; 5 wells in Pajarito Canyon; 8 wells in Los Alamos Canyon; 3 wells in Mortandad Canyon; 4 wells in Water/Canyon del Valle	water levels, radionuclides, metals, alkalinity, anions, dioxins, ammonium, pesticides, PCBs, SVOCs, cyanide, TDS	LANL FIMAD data base	ER Project measurements
NMED	Ground water	June 15, 2000	5 springs,	selected radiological, inorganic, and organic analytes	NMED data base	

Table 4.2e. Organizations conducting sediment sampling related to the Cerro Grande fire.

Organization	Type of Sample	Sampling Date	Number of Stations/ Location	Analyte	Data Storage	Other Information
LANL	Sediment	Sampled once a year or as necessary	monitoring sites		ESH-18 Access Data Base	ESH-18
	Sediment	baseline taken by June 5, 2000	Sediment surveys in Los Alamos Canyon (between reaches LA-2 and LA-3) and Mortandad Canyon on San Ildefonso boundary to supplement existing data	Gamma-emitting radionuclides	LANL FIMAD data base	ER Project, walkover radiation survey
	Sediment	baseline taken by June 5, 2000	Sediment sampling: 23 samples from 3 reaches in Pajarito Canyon; 7 samples from 1 reach in Three Mile Canyon; 28 samples from 4 reaches	Radionuclides, inorganics, organics	LANL FIMAD data base	ER Project, direct soil sampling

			in Two mile Canyon; 23 samples from 3 reaches in Water Canyon; 7 samples from 1 reach in LA Canyon; 9 samples from 1 reach in Canada del Buey; and 17 samples from 2 reaches in Sandia Canyon; (Pueblo Canyon sampling is complete from existing ER data)			
	Sediment	Post-flood	7 canyons monitored post-flood	selected analytes	LANL FIMAD data base	ER Project, direct sediment sampling
	Sediment/soil	Post-flood	2 canyons monitored post-flood	walkover gross gamma survey	LANL FIMAD data base	ER Project, gamma survey
NMED	Sediment	June 5, 2000	One sample each from Los Alamos Canyon and Pueblo Canyon	selected radiological, inorganic, and organic analytes	NMED data base	

	Sediment	June 29, 2000	5 samples, Pajarito Canyon at SRT501, Pajarito at Jct. of Two Mile Canyon, Two Mile Canyon at Jct. with Pajarito Canyon, Pajarito Canyon at SR 4, Water Canyon at SRS 4			
USEPA	Sediment and soil	after storm events	Los Alamos County property, San Ildefonso Pueblo, Cochiti Pueblo	Radiological and non- radiological constituents		

Table 4.3. Organizations conducting soil sampling related to the Cerro Grande fire.

Organization	Type of Sample	Collection Date	Location	Constituent	Data Storage	Other Information
LANL	Soil	6-13-00	LANL TA-16, TA-06, and TA-15; Cerro Grande	Organics I ^c	Data Base (Fresquez)	ESH-20 sampling program
	Soil	6-13-00	LANL Composite (TA-06, TA-15, TA-16); Cerro Grande	Organics II ^d	Data Base (Fresquez)	ESH-20 sampling program
	Soil	6-5-00	12 LANL, 10 Perimeter, 3 Regional sites	Radionuclides ^a , Metals ^b , Organics III ^e	Data Base (Fresquez)	ESH-20 sampling program
	Soil	6-13-00	Perimeter (White Rock [east], Airport [west])	Organics I	Data Base (Fresquez)	ESH-20 sampling program
	Soil	6-13-00	Perimeter (Airport [west])	Organics II	Data Base (Fresquez)	ESH-20 sampling program
	Soil	6-19-00	Pena Blanca, Embudo, Pecos, Ojo Sarco, Abiquiu, Espanola (organic gardens)	Radionuclides, metals, Organics I, Organics II	Data Base (Fresquez)	ESH-20 sampling program

	Soil	Before and after storm events	Los Alamos, Pueblo, Sandia, Pajarito, Two Mile, Three Mile, and Water Canyons, and Canada del Buey	Radionuclides, inorganics, organics	LANL FIMAD data base	ER Project, direct soil sampling
NMED	Soil (swipe samples)	May 11 – 16, 2000	various locations from La Bajada to San Juan Pueblo	gross alpha	NMED data base	
	Soil	June 20, 2000	Ojo Sarco, Embudo, El Llano	Radionuclides (may include isotopic Pu, isotopic Am, isotopic U, Sr-90), 23 metals, cyanide	NMED data base	
	Soil	July 5, 2000	Nambe, La Mesilla, Medenales, Velarde	Radionuclides (may include isotopic Pu, isotopic Am, isotopic U, Sr-90), 23 metals, cyanide	NMED data base	
	Soil	July 6, 2000	Arroyo Seco, Sombrillo, Chamita	Radionuclides (may include isotopic Pu,	NMED data base	

				isotopic Am, isotopic U, Sr-90), 23 metals, cyanide		
	Soil	July 10, 2000	Pena Blanca	Radionuclides (may include isotopic Pu, isotopic Am, isotopic U, Sr-90), 23 metals, cyanide	NMED data base	
	Soil	July 11, 2000	Dixon, Truchas, Picuris Pueblo	Radionuclides (may include isotopic Pu, isotopic Am, isotopic U, Sr-90), 23 metals, cyanide, PNAs, PAHs	NMED data base	
	Soil	July 14, 2000	Taos	Radionuclides (may include isotopic Pu, isotopic Am, isotopic U, Sr-90), 23 metals, cyanide, Dioxins/furans	NMED data base	
	Soil	July 18, 2000	Alcalde, Chimayo	Radionuclides (may include isotopic Pu, isotopic Am,	NMED data base	

				isotopic U, Sr-90), 23 metals, cyanide		
	Soil	July 20, 2000	Hernandez, La Puebla, San Juan	Radionuclides (may include isotopic Pu, isotopic Am, isotopic U, Sr-90), 23 metals, cyanide, PNAs(PAHs) (Hernandez), Dioxins/furans (La Puebla, San Juan)	NMED data base	
	Soil	July 21, 2000	Abiquiu	Radionuclides (may include isotopic Pu, isotopic Am, isotopic U, Sr-90), 23 metals, cyanide, PNAs(PAHs)	NMED data base	
USDOE/RAP	Surface soil measurements with “Violinist” instrument	May 12, 13, 14, 2000	69 locations in surrounding area: Santa Fe, Rio Arriba, and Bernalillo Counties	Pu-238, Pu-239/240, Am-241	USDOE/AL	survey results using field instruments

^aRadionuclides: gamma scan, Cs-137, Am-241, total U, U 235/238, Pu-238, Pu-239/240, Sr-90, gross alpha, beta and gamma activity.

^bMetals: Ag, Al, As, B, Ba, Be, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Ti, V, Zn.

^cOrganics I: High Explosives (HE) (Nitroaramatics and nitroamines), Organochlorine Pesticides, Polychlorinated Biphenyls (PCBs), Polycyclic Aromatic Hydrocarbons (PAHs).

^dOrganics II: Dioxins/Furans

^eOrganics III: Volatile Organic Compounds (VOC) and Semi volatile Organic Compounds (SVOC)

Table 4.4. Organizations conducting biota sampling related to the Cerro Grande fire.

Organization	Type of Sample	Collection Date	Location	Constituent	Data Storage	Other Information
LANL	Ash (bark)	5-24-00	LANL TA-16, TA-06, and TA-15; Cerro Grande	Radionuclides ^a , Metals ^b	Data Base (Gonzales)	Gamma scan completed and reported to management on 6-15-00
	Ash (bark)	6-12-00	LANL TA-16, TA-06, and TA-15; Cerro Grande	Organics I ^c	Data Base (Gonzales)	
	Ash (surface) plus soil	6-13-00	LANL TA-16, TA-06, and TA-15; Cerro Grande	Organics I	Data Base (Gonzales)	
	Ash (surface) plus soil	6-13-00	LANL Composite (TA-16, TA-06, and TA-15); Cerro Grande	Organics II ^d	Data Base (Gonzales)	
	Ash/muck		9 samples 1. Transect across Jemez mountain front 2. Area near route 501			ER project
	Produce	6-26-00 to 7-1-00	LANL, gardens in: Los Alamos, White Rock, San Ildefonso, Espanola, Cochiti	Radionuclides, Metals	Data Base (Fresquez)	ESH-20 sampling program

	Fish	6-29-00	Cochiti Reservoir	Radionuclides, Metals, PCBs	Data Base (Fresquez)	ESH-20 sampling program
	Fish	7-27-00	Rio Grande at Cochiti Reservoir	Radionuclides, metals, organics I and organics II	Data Base (Fresquez)	Some fish (carp) will have whole body and viscera separated and analyzed
	Fish	8-29-00	Rio Grande at Cochiti Reservoir	Radionuclides, metals, organics I and organics II	Data Base (Fresquez)	Some fish (carp) will have whole body and viscera separated and analyzed
	Fish	9-xx-00	Rio Grande at: <ul style="list-style-type: none"> • Cochiti Reservoir, • upstream from San Ildefonso • confluence with Frijoles Canyon 	Radionuclides, metals, organics I and organics II	Data Base (Fresquez)	Some fish (carp) will have whole body and viscera separated and analyzed
	Fish	After storm events	Cochiti Reservoir	Radionuclides, Metals, PCBs	Data Base (Fresquez)	ESH-20 sampling program
NMED	Ash	May 25, 2000	4 samples in Upper Pajarito Canyon west of LANL	selected radiological, inorganic, and organic	NMED data base	

				analytes		
	Ash	May 30, 2000	2 samples, TA-6 and TA-36	selected radiological, inorganic, and organic analytes	NMED data base	
	Ash	June 1, 2000	2 samples at Sportsman Club	selected radiological, inorganic, and organic analytes	NMED data base	
	Ash	June 12, 2000	5 samples, Armstead Spring, TA-6, Cerro Grande	selected radiological, inorganic, and organic analytes	NMED data base	
	Ash	June 14, 2000	3 samples, Quemazon Trail, Pipeline Road, Pajarito Ski Hill	selected radiological, inorganic, and organic analytes	NMED data base	
	Ash	June 15, 2000	3 samples, Homestead Spring, Starmer Spring, Bulldog Spring	selected radiological, inorganic, and organic analytes	NMED data base	
	Ash	June 16, 2000	American Springs, Canon del Valle	selected radiological, inorganic, and	NMED data base	

				organic analytes		
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^aRadionuclides: gamma scan, Cs-137, Am-241, total U, U 235/238, Pu-238, Pu-239/240, Sr-90, gross alpha, beta and gamma activity.

^bMetals: Ag, Al, As, B, Ba, Be, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Ti, V, Zn.

^cOrganics I: High Explosives (HE) (Nitroaramatics and nitroamines), Organochlorine Pesticides, Polychlorinated Biphenyls (PCBs), Polycyclic Aromatic Hydrocarbons (PAHs).

^dOrganics II: Dioxins/Furans

Table 4.5. Organizations conducting environmental radiation measurements related to the Cerro Grande fire.

Organization	Type of Sample	Collection Date	Location	Constituent	Data Storage	Other Information
LANL	TLDs	Operated continuously before, during, and after the fire	199 sites around the Laboratory and surrounding communities	External gamma radiation, (192 sites); neutron radiation (7 sites)	ESH-17 data base	
	NEWNET, Real time pressurized ion chamber	Operated continuously before, during, and after the fire	19 locations	External gamma radiation	on World Wide Web, NIS-5 data base	real time. Server/stations were off-line during the fire. Available at http://NEWNET.lanl.gov/ .
NMED	TLDs	Operated continuously before, during, and after the fire	12 locations	External gamma radiation	NMED data base	

Table 4.6. Organizations conducting other measurements related to the Cerro Grande fire.

Organization	Type of Sample	Collection Date	Location	Constituent	Data Storage	Other Information
LANL	Laser altimetry	before June 5, 2000	Pueblo, Pajarito, Los Alamos, Mortandad, Water, Canyon del Valle, and Canada del Buey	NA	ER Project	ER Project
	Fire retardant	before June 5, 2000	Offsite-Jemez mountains		ER Project	ER Project
USDOE/RMS	Multi-spectral infrared scans	May 17, May 30 – 31, 2000	Santa Fe National Forest, LANL, Los Alamos Townsite, White Rock	NA	RMS (Bechtel Nevada)	

Table 4.7. Organizations conducting biological and cultural evaluations related to the Cerro Grande fire.

Organization	Type of Sample	Collection Date	Location	Constituent	Data Storage	Other Information
LANL	T&E Species	5-30 to present	Lab-wide	Habitat	(Hansen)	GAER Report
	General Wildlife	5-30 to present	Within and near burned perimeter of LANL	Water source condition assessment	(Biggs)	
	Mexican Spotted Owl Survey		Cannon de Valle	Presence/absence	(Keller)	Have made contact after fire
	Vegetation Survey	6-5 to present	US Forest Service land and Lab burned areas	Resurvey burned vegetation plots	Data Base (Balice)	
	Vegetation Reestablishment	Planned	Burned areas of Lab	Seeding success, diversity	Data Base (Loftin)	BAER
	Archaeology	5-30 to present	Within burned perimeter of LANL	Damage to historic and prehistoric sites	GIS, Hard copy forms at ESH-20 (Issacson)	Continuing process of assessment as time allows.

Table 5.0. Organization contacts for sampling related to the Cerro Grande Fire.

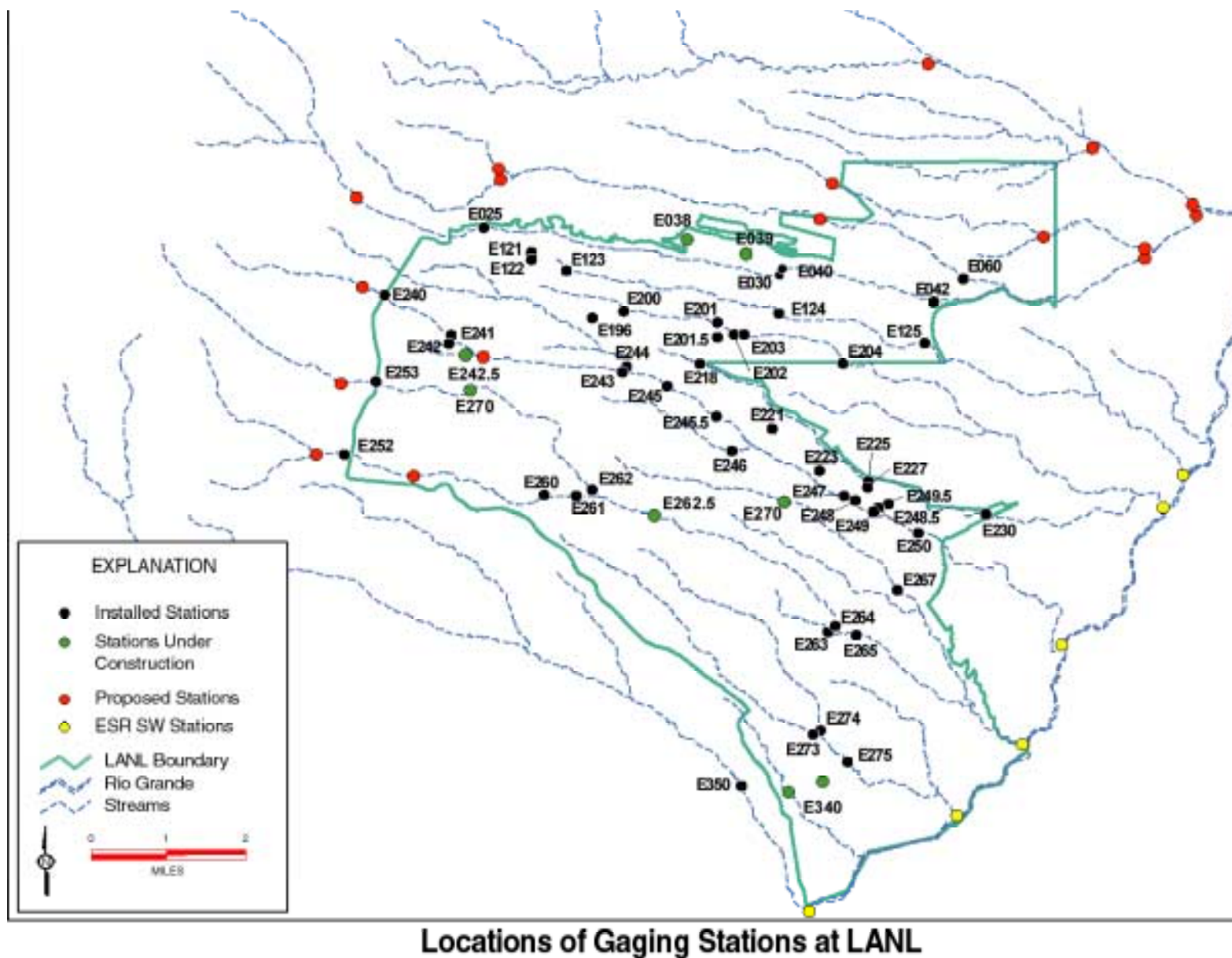
Organization	Air Sampling	Surface Water, Ground Water, and Sediment	Soil (non-PRS/PRS)	Biota	External Radiation	Other (laser theodolyte, LIDAR, multi-spectral imaging, ...)	Biological and Cultural
Los Alamos National Laboratory	Jean Dewart, ESH-17, 665-0239	David Rogers, ESH-18, 505-667-0313; Billy Turney, ESH-18, 505-665-8572; Robin Reynolds, ESH-18, 505-667-4689; Danny Katzman, EES-13, 505-667-0599	Phil Fresquez, ESH-20, 667-0815/ Danny Katzman, EES-13, 505-667-0599	Phil Fresquez, ESH-20, 505-667-0815	Jean Dewart, ESH-17, 665-0239/ Danny Katzman, EES-13, 505-667-0599	Danny Katzman, EES-13, 505-667-0599	Phil Fresquez, ESH-20, 505-667-0815
New Mexico Environment Department	Sandra Ely, NMED/AQB, 505-827-1494; Dave Baggett, NMED/AIP, 505-672-0458	Michael Dale, NMED/AIP, 505-672-0449; Ralph Ford-Schmid, NMED/AIP, 505-827-1536; Sandy Spon, NMED/SWQB 404/401 State Certification, 505-827-2803; John Kieling,	Dave Englert, NMED/AIP, 505-827-1536; John Kieling, NMED/HWB 505-827-1558 (x1012); John Young, NMED/HWB 505-827-1557 (x1036)	Dave Englert, NMED/AIP, 505-827-1536; Ralph Ford-Schmid, NMED/AIP, 505-827-1536; John Kieling, NMED/HWB 505-827-1558 (x1012); John Young, NMED/HWB	Dave Baggett, NMED/AIP, 505-672-0458		Ralph Ford-Schmid, NMED/AIP, 505-827-1536

		NMED/HWB 505-827-1558 (x1012); John Young, NMED/HWB 505-827-1557 (x1036)		505-827-1557 (x1036)			
U. S. Environmental Protection Agency	Greg Dempsey, USEPA/LV, 702-798-2461	Rich Mayer, USEPA, 214- 665-7442	Rich Mayer, USEPA, 214- 665-7442				
U. S. Department of Energy/ Radiological Assistance Program	Jim Straka, USDOE/AL, 505-845-5581	Jim Straka, USDOE/AL, 505-845-5581	Jim Straka, USDOE/AL, 505-845-5581	Jim Straka, USDOE/AL, 505-845-5581	Jim Straka, USDOE/AL, 505-845-5581		
San Ildefonso Pueblo	Neil Weber, Department of Environmental and Cultural Preservation, San Ildefonso Pueblo, 505- 455-2273	Neil Weber, Department of Environmental and Cultural Preservation, San Ildefonso Pueblo, 505- 455-2273	Neil Weber, Department of Environmental and Cultural Preservation, San Ildefonso Pueblo, 505- 455-2273	Neil Weber, Department of Environmental and Cultural Preservation, San Ildefonso Pueblo, 505- 455-2273	Neil Weber, Department of Environmental and Cultural Preservation, San Ildefonso Pueblo, 505- 455-2273	Neil Weber, Department of Environmental and Cultural Preservation, San Ildefonso Pueblo, 505- 455-2273	Neil Weber, Department of Environmental and Cultural Preservation, San Ildefonso Pueblo, 505- 455-2273
Santa Clara Pueblo	Joe Chavarria, Office of Environmental Affairs, Santa Clara Pueblo, 505-753-7326	Joe Chavarria, Office of Environmental Affairs, Santa Clara Pueblo, 505-753-7326	Joe Chavarria, Office of Environmental Affairs, Santa Clara Pueblo, 505-753-7326	Joe Chavarria, Office of Environmental Affairs, Santa Clara Pueblo, 505-753-7326	Joe Chavarria, Office of Environmental Affairs, Santa Clara Pueblo, 505-753-7326	Joe Chavarria, Office of Environmental Affairs, Santa Clara Pueblo, 505-753-7326	Joe Chavarria, Office of Environmental Affairs, Santa Clara Pueblo, 505-753-7326

Jemez Pueblo	Bill Whatley, Department of Resource Protection, Jemez Pueblo, 505-834-7696	Bill Whatley, Department of Resource Protection, Jemez Pueblo, 505-834-7696	Bill Whatley, Department of Resource Protection, Jemez Pueblo, 505-834-7696	Bill Whatley, Department of Resource Protection, Jemez Pueblo, 505-834-7696	Bill Whatley, Department of Resource Protection, Jemez Pueblo, 505-834-7696	Bill Whatley, Department of Resource Protection, Jemez Pueblo, 505-834-7696	Bill Whatley, Department of Resource Protection, Jemez Pueblo, 505-834-7696
Cochiti Pueblo	Jacob Pecos, Cochiti Environmental Protection Office, Cochiti Pueblo, 505- 465-0617	Jacob Pecos, Cochiti Environmental Protection Office, Cochiti Pueblo, 505- 465-0617	Jacob Pecos, Cochiti Environmental Protection Office, Cochiti Pueblo, 505- 465-0617	Jacob Pecos, Cochiti Environmental Protection Office, Cochiti Pueblo, 505- 465-0617	Jacob Pecos, Cochiti Environmental Protection Office, Cochiti Pueblo, 505- 465-0617	Jacob Pecos, Cochiti Environmental Protection Office, Cochiti Pueblo, 505- 465-0617	Jacob Pecos, Cochiti Environmental Protection Office, Cochiti Pueblo, 505- 465-0617
Los Alamos County	Joe King, Los Alamos County, 662- 5180	Joe King, Los Alamos County, 662- 5180	Joe King, Los Alamos County, 662- 5180	Joe King, Los Alamos County, 662- 5180	Joe King, Los Alamos County, 662- 5180	Joe King, Los Alamos County, 662- 5180	Joe King, Los Alamos County, 662- 5180
U.S. Geological Survey		Mike Roark, NM District, 505-830-7900, ext. 7954 (Jack Veenhuis, USGS/WRD, 505-830-7957, for information on Dome Fire runoff)					
U. S. Army Corps of		Jim Wood, Albuquerque.					

Engineers		District, 505-342-3280, James.a.wood@spa02.usace.army.mil ; David Griego, 505-342-3374					
U.S. Forest Service		Leonard Atencio, SF Forest , Forest Supervisor 505-438-7809	Leonard Atencio, SF Forest , Forest Supervisor 505-438-7809	Leonard Atencio, SF Forest , Forest Supervisor 505-438-7809		Leonard Atencio, SF Forest , Forest Supervisor 505-438-7809	
U. S. Park Service/ Bandelier National Monument		Brian Jacobs, BNM, 505-672-3861, x545	Brian Jacobs, BNM, 505-672-3861, x545	Brian Jacobs, BNM, 505-672-3861, x545		Brian Jacobs, BNM, 505-672-3861, x545	Brian Jacobs, BNM, 505-672-3861, x545
US Fish and Wildlife Service		Russ MacRae, USFW, Albq. Field Office, 505-346-2525, x124	Russ MacRae, USFW, Albq. Field Office, 505-346-2525, x124	Russ MacRae, USFW, Albq. Field Office, 505-346-2525, x124		Russ MacRae, USFW, Albq. Field Office, 505-346-2525, x124	Russ MacRae, USFW, Albq. Field Office, 505-346-2525, x124

Figure 4.2a. Location of Gaging Stations at LANL



ATTACHMENT

Priority Analytes by Drainage

Drainage	Priority Analyte	Volume Required (L)
Los Alamos Canyon	TKN/COD/Ammonium/NO2+N	1
DP Canyon	O3**	1
Pueblo Canyon	Cyanide**	.2
Mortandad Canyon	TSS (composite and max)*	6
Ten Site Canyon	Radiochemistry (total)	6
Guaje Canyon	Radiochemistry (dissolved)	1
	Metals (total recoverable)*	1
	Metals (dissolved)	2
	SVOA/PCB	1
	Dioxins/furans	
		Total 19.2
Sandia Canyon	TKN/COD/Ammonium/NO2+N	1
	O3**	1
	Cyanide**	1
	Oil & Grease**	.2
	TSS (composite and max)*	6
	Radiochemistry (total)	6
	Radiochemistry (dissolved)	1
	Metals (total recoverable)*	1
	Metals (dissolved)	2
	PCB/SVOA	1
	Dioxins/furans	
		Total 19.2
Canada del Buey	TKN/COD/Ammonium/NO2+N	1
Ancho Canyon	O3**	1
	Cyanide**	.2
	TSS (composite and max)*	6
	Radiochemistry (total)	6
	Radiochemistry (dissolved)	1
	Metals (dissolved)	1
	Metals (total recoverable)*	1
	PCB***	1
	SVOA	1
	Dioxins/furans	1
	HE	
		Total 20.2
Pajarito Canyon	TKN/COD/Ammonium/NO2+N	1
Potrillo Canyon	O3**	1
Water Canyon	Cyanide**	.2
Canon de Valle	TSS (composite and max)*	6

Drainage	Priority Analyte	Volume Required (L)
S-Site Canyon Indio Canyon	Radiochemistry (total)	6
	Radiochemistry (dissolved)	1
	Metals (total recoverable)*	1
	Metals (dissolved)	2
	SVOA/PCB	1
	Dioxins/furans	1
	HE	
		Total 20.2
Area G (front) G-1 G-2 G-3 G-4 G-5	TKN/COD/Ammonium/NO2+N	1
	O3**	1
	Cyanide**	0.5
	Conductance/TDS**	.2
	TSS (composite and max)*	6
	Radiochemistry (total)	6
	Radiochemistry (dissolved)	1
	Metals (total recoverable)*	1
	Metals (dissolved)	1
	PCB***	1
	SVOA	1
	Dioxins/furans	1
	HE	
		Total 20.7
Area G (back) G-6	TKN/COD/Ammonium/NO2+N	1
	O3**	1
	Cyanide**	0.5
	Conductance/TDS**	0.2
	TSS (composite and max)*	6
	Radiochemistry (total)	6
	Radiochemistry (dissolved)	1
	Metals (total recoverable)*	1
	Metals (dissolved)	1
	PCB***	1
	SVOA	1
	Dioxins/furans	
		Total 19.7
Frijoles	TKN/COD/Ammonium/NO2+N	1
	O3**	1
	Cyanide**	0.5
	Conductance/TDS**	0.2
	TSS (composite and max)*	6
	Radiochemistry (total)	6
	Radiochemistry (dissolved)	1
	Metals (total recoverable)*	1
	Metals (dissolved)	1

Drainage	Priority Analyte	Volume Required (L)
	PCB***	1
	SVOA	1
	Dioxins/furans	
		Total 19.7

* Storm water permit requirement. First priority once per quarter.

** Storm water permit requirement only.

*** Storm water permit requirement. First priority once per year.